

# **TOILET CLEANING APPARATUS AND CADDY**

## **Priority Claim**

[0001] This application claims the benefit of U.S. provisional patent application number 60/408,410 filed on September 5, 2002 the entirety of which is hereby incorporated by reference and claims the benefit of provisional patent application number 60/434,862 filed on December 19, 2002, the entirety of which is hereby incorporated by reference.

## **Background of the Invention**

[0002] One of the most difficult chores in the bathroom is cleaning the toilet bowl. Traditional methods of bowl cleaning utilize two common objects, first a container of cleaner in either a liquid or granular form and second a scrub brush. The cleaning method involves introducing the cleaner into the bowl water or bowl sides and then manipulating the scrub brush to manually cleanse soiled areas above and below the bowl waterline.

[0003] Traditional methods and objects have a number of drawbacks. First, it is often difficult to bring the cleaner into areas above the waterline within the bowl. Some cleaner containers include angled necks allowing cleaner to be directly applied to this surface, but to coat the entire bowl requires more cleaner than would normally be used. Second, a scrub brush is often remains dirty after cleaning the bowl is complete. The brush is swished in semi-clean refill water and removed to dry in a caddy or by simply being stood up in a corner. Finally a user often is sprinkled by dirty water from the bristles of a scrub brush at one time or another during the cleaning process.

[0004] An efficient cleaning method using superior tools is desired. At the conclusion of the cleaning process any tools which must be stored within the bathroom should be clean. Additionally, there should be an easy way to get the cleaner into the areas above the bowl water line.

## **Summary of the Present Invention**

[0005] The present apparatus and method overcomes the shortcomings in the prior art. The present apparatus includes a one time use swab which may be flushed into the toilet drain after the cleaning process is complete. The swab may include a pre-applied detergent thus making it

easy to get the detergent into areas above the bowl waterline. The tool which holds the swab provides a way to remove the swab without the users hand contacting the swab. A caddy which supports the tool also provides means for loading a swab onto the tool without a user touching the head of the tool.

[0006] In one embodiment the apparatus includes a tool having a handle section and a head having two or more separable portions wherein the portions of the head may be manipulated into multiple configurations by a user of the tool wherein one of the configurations assists in holding a swab upon the head of the tool under a spring bias.

[0007] In another embodiment the apparatus includes a tool having a head and a handle section, a flushable swab having a pocket-like configuration and fitting over the head of the tool for attachment thereto wherein the tool has a loading position wherein the swab is placed upon the tool, an operating position wherein the tool assists in holding the swab upon the tool, and a removing position, wherein the tool assists in displacing the swab from the tool. These and other features, aspects and advantages of the present invention will be fully described by the following description, appended claims, and accompanying drawings.

### **Brief Description of the Figures**

[0008] Figure 1a is a side view of a preferred embodiment of a toilet cleaning tool;

[0009] Figure 1b is a top view of the preferred embodiment of the toilet cleaning tool;

[00010] Figure 1c is a bottom view of the preferred embodiment of the toilet cleaning tool;

[00011] Figure 2 is an exploded view of the preferred embodiment of the toilet cleaning tool;

[00012] Figure 3a is a side view of the toilet cleaning tool and a swab;

[00013] Figure 3b is a side view of the toilet cleaning tool with the swab fitted to the tool;

[00014] Figure 4 is a cut away view of the preferred embodiment of the toilet cleaning tool in a first operative configuration;

- [00015] Figure 5 is a cut away view of the preferred embodiment of the toilet cleaning tool in another operative configuration;
- [00016] Figure 6 is an exploded view of a caddy;
- [00017] Figure 7 is a side view of the toilet cleaning tool and a swab supported by the caddy;
- [00018] Figure 8 is a perspective view of the toilet cleaning tool and caddy affixed to a display device for use in sale;
- [00019] Figure 9a is top view of a one piece swab prior to full assembly;
- [00020] Figure 9b is a top view of an assembled one piece swab;
- [00021] Figure 9c is a side view of an assembled one piece swab;
- [00022] Figure 9d is a top view of an assembled two piece swab;
- [00023] Figure 9e is a side view of an assembled two piece swab;
- [00024] Figure 9f is a dimensional representation of a one or two piece swab;
- [00025] Figure 10a is a perspective view of an alternate embodiment of a toilet cleaning tool and an alternate embodiment of a caddy;
- [00026] Figure 10b is a perspective view of the alternate embodiment of the caddy alone;
- [00027] Figure 11 is a cutaway view of an alternate embodiment of a toilet cleaning tool in a first operative position;
- [00028] Figure 12 is a cutaway view of the alternate embodiment of a toilet cleaning tool in a second operative position;
- [00029] Figure 13 is a cutaway view of the alternate embodiment of a toilet cleaning tool in a third operative position

[00030] Figure 14 is a perspective view of yet another alternate embodiment of the toilet cleaning tool;

[00031] Figure 15a is a perspective view of the alternate embodiment of the toilet cleaning tool and swab;

[00032] Figure 15b is a perspective view of the alternate embodiment of the toilet cleaning tool with the swab fitted to the tool; and

[00033] Figure 15c is a perspective view of the alternate embodiment of the toilet cleaning tool and swab with the swab removed for disposal.

#### **Detailed Description of the Preferred and Alternate Embodiments**

[00034] As described in more detail below and shown in Figure 3a, a toilet cleaning apparatus 15 is provided which includes a tool 20 and a disposable swab 90. The apparatus 15 may be stored upon a caddy 80 as shown in Figure 7.

[00035] Referring to Figures 1a-c and 2, the tool 20 includes a handle section 30, a middle section 40 and a head 60. Within the tool 20 a pushrod assembly 50 including actuation components is held. The pushrod assembly 50 is actuated to shift the head 60 into one of three distinct configurations (Neutral, Use, Eject) shown in Figures 3a, 4 and 5. Each configuration of the pushrod assembly 50 and head 60 serves a particular purpose in the manipulation of the disposable swab 90.

[00036] Referring back to Figures 1a-c and 2 the handle section 30 is at one end of the tool 20 and includes a portion for gripping 32, which may be ribbed, and a slot portion 34 for accessing a slide control button 52 which extends out from the pushrod assembly 50 within the tool 20. The slot portion 34 of the handle section 30 includes a notch 35 into which the slide control button 52 may be rotated to lock the pushrod assembly 50 in the Use configuration or position. The portion for gripping 32 may be a series of rubber grips added by an overmolding process. Handle slots 31 may be left within the handle section 30 when it is molded and a second molding

process adds the portion for gripping 32. The handle section 30 may be hollow and may have a generally tubular shape which is easily grasped by the human hand.

[00037] The middle section 40 is adjacent to the handle section 30 and extends in a generally straight direction until bending close to the position where the middle section 40 joins the head 60. The middle section 40 may also be hollow. The head 60 is located adjacent to the middle section 40 opposite of the handle section 30. The head 60 is also preferably hollow. The head 60 may be made of two portions 62 and 64. These portions 62 and 64 may be generally symmetrical shaped halves. The head 60 is shaped in the same general shape as the swab 90 which fits over the head 60. The head 60 may include protrusions, teeth or texturing 70 to assist in holding the swab 90 in place during use. The head 60 may also include one or more holes 61 at the end opposite of the middle section 40 to drain any fluid which may accumulate within the head 60, middle section 40 or handle section 30. At this end of the head 60 the head portions 62 and 64 may also include relieved portions of reduced thickness which provide a small gap between the portions 62 and 64. The gap allows the two head portions 62 and 64 to be opened as described in more detail below without interfering with each other. An additional drain hole 43 is provided within the middle section 40.

[00038] In a preferred embodiment, the handle section 30, middle section 40 and head 60 of tool 20 are manufactured from common material which can be any polymer, including: polycarbonate, cycolac or Acrylonitrile Butadiene Styrene (ABS). In one embodiment of the invention one portion of the handle section 30, middle section 40 and head 60 are molded as a single piece. Additionally, the remaining portion of the handle section 30 and middle section 40 are molded in a second piece. This allows the pushrod assembly 50 to be easily placed within the middle section 40 and handle section 30 and sealed in place by attachment of the remaining piece of the handle section 30 and middle section 40. The pieces may be attached by sonic welding techniques or solvent bonding. A number of tabs and slots or other alignment guides may be molded into the tool pieces to facilitate the alignment and joining process. Alignment ribs 41 are molded into the middle section 40 and handle section 30 to provide a guide for the pushrod assembly 50. The alignment ribs 41 may be placed at similar positions upon the matching molded pieces of the middle section 40 or may be offset for the purpose of allowing drainage of any accumulated water within the tool 20. The alignment ribs 41 may also be used

for holding the springs 54 or other components of the pushrod assembly 50 in a desired position and as stopping points for motion of the slider washer 55. The second portion 62 of the head 60 may be molded as a solitary piece.

[00039] The pushrod assembly 50 fits within the tool 20 and includes a long narrow pushrod 56, the slide control button 52 used to actuate the pushrod 56, springs 53 and 54, a slider washer 55 as well as other washers and clips on either side of the button 52 to assist in moving the button 52 to and from desired positions. The slide control button 52 may be rotated within the handle section 30, however the rotation is constrained by the openings of the slot portion 34. At the end of the pushrod assembly 50 opposite the control button 52 a cam 58 is used to interact with the head 60 of the tool 20. The cam 58 may interact with the head 60 via a cam follower plate 66 used to assist in translating movement of the pushrod 56 to the head 60. The cam follower plate 66 is flat and may be attached to one half of the head 60. The cam follower plate may also include slots on its sides which in combination with pivot pins 68 on the head portion 64 act as a guide mechanism.

[00040] The slider washer 55 is affixed to the pushrod 50, but can interfere with the alignment ribs 41 upon the middle section, thus predetermined positions of the pushrod assembly 50 may be reached at these points of interference as described in more detail below.

[00041] Another spring 59 is located within the head 60 and affixed at one end to the cam 58 and at another end to the one portion 62 of the head 60 or the cam follower plate 66. Spring 59 makes sure that the head portion 62 does not get disengaged from the pushrod assembly 50. Spring 59 also expands when the head is in the Use position and helps prevent any binding when the tool 20 is moved from the Use to Neutral positions.

[00042] The lower portion of the head 62 may include two pivot pins 68. The pivot pins 68 interact with slots on the side of the cam follower plate 66. The pivot pins 68 allow the upper position 62 to be pivoted into the Use position. Additionally the pivot pins 68 guide the movement of the upper position of the head 62 to be extended into the Eject position.

[00043] Referring to Figure 2-5, the pushrod assembly 50 housed within the tool 20 may be moved amongst three configurations or positions in order to allow different functions to be

performed. Movement of the pushrod 56 is accomplished by moving the slide control button 52, typically by a user's thumb as the user grips the handle section 30 of the tool 20 as well as through the action of springs 53 and 54 and slider washer 55. A first position shown in Figure 3a, the Neutral or loading position, is recognized by the position of the two portions 62 and 64 of the head. The two portions 62 and 64 are aligned and all edges of each portion 62 are in close proximity to each of the corresponding edges of the opposite portion 64. This Neutral position is used for application or loading of the swab 90 around the head 60 of the tool 20 as shown in Figure 3b. No user contribution is necessary to place the head and pushrod assembly into the Neutral position. When the pushrod assembly 50 is in the Neutral position, the springs 53 and 54 shown in Figure 2 within the handle section 30 are in a generally uncompressed/unextended state.

[00044] The pushrod assembly 50 may be moved to a Use or operating position as shown in Figure 4 in which the two portions 62 and 64 of the head 60 remain aligned, but only the edges opposite the middle section 40 are in close proximity (resembling an open clam shell). The relieved portions of the head portions 62 and 64 prevent any interference when the pushrod assembly is in this position. In this Use position tension is applied to the overlying swab 90 (not shown) to prevent it from falling off of the head 60. Separation of the two portions 62 and 64 of the head is accomplished by the interaction of the pushrod assembly's cam 58 with the cam follower plate 66 which is affixed to one portion 62 of the head 60. Referring to Figure 2, the cam 58 includes a groove 57 on one or both of its side faces. The cam follower plate 66 includes one or more pins 67 which fit into the grooves 57 on the cam 58. As the pushrod 56 and cam 58 are retracted into the middle section 40 of the tool 20, the pins 67 within the cam follower plate 66 follow the grooves 57 within the cam 58 and as a result push one portion 62 of the head 60 upwards. In moving to the Use position, spring 53 of the pushrod assembly 50 is slightly compressed until slider washer 55 reaches a stop point and then spring 53 is noticeably compressed. The pushrod assembly 50 may be locked in the Use position by rotating the slide control button 52 into the notch 35 of the slot portion 34. Spring 54 remains in a generally uncompressed/unexpanded state in the Use position. However if the head portions 62 and 64 are compressed together during use in a locked Use position, this results in compression of spring 54 which in turn tries to reexpand. As a result a tensioning function is provided even though the button 52 is in a locked position. This tensioning function is helpful because it allows the head

portions 62 and 64 to rebound if compressed by force applied during bowl scrubbing. Also if the swab 90 swells slightly during use, the tensioning function will allow the head portions 62 and 64 to open further and keep force upon the swab 90, thus keeping it upon the tool 20.

[00045] Referring to Figure 5, the pushrod assembly 50 and head 60 may also be moved to an Eject or removing position. In the Eject position, one portion 62 of the head 60 is pushed forward and out of alignment from the second portion 64. In this position, the swab 90 (not shown) is also pushed forward and may easily be removed from the head 60. To reach the Eject position from the Neutral position, the pushrod 56 is extended further out of the middle section 40 of the tool 20 by the slide control button 52. The cam 58 includes a face which contacts a surface upon the cam follower plate 66 of the head 60. The movement of the cam follower plate 66 then moves one half 62 of the head 60. In the Eject position one spring 54 of the pushrod assembly 50 is compressed while spring 53 remains in a generally uncompressed/unexpanded state.

[00046] Referring to Figures 3a, 3b and 9a-f, the swab 90 has a shape generally similar to that of the head 60. In a preferred embodiment, the swab 90 has a pocket-like configuration wherein a majority of the head 60 is covered by the swab 90, and the open end of the pocket allows the two portions 62 and 64 of the head 60 to be manipulated in the manners previously described. In a preferred embodiment of the invention the swab 90 when placed over the head 60 extends to the point of greatest width of the head 60. The swab 90 can be made of any non-paper material, but is preferably a blend of cotton and rayon. A reasonably biodegradable natural or synthetic fiber which is easily bonded and capable of being processed into a non-woven fabric may be substituted for rayon. The blend may contain anywhere from 0 to 100 percent cotton by weight. A preferred blend range is from about 75 percent cotton and about 25 percent rayon to about 85 percent cotton and about 15 percent rayon by weight. A preferred blend within the range is about 80 percent cotton and about 20 percent rayon. In a preferred embodiment the blend is non-woven and needle punched. As a substitute for needle punching, the blend may be hydro entangled. The rayon may have a denier of 8.

[00047] The swab material, without a coating of detergent, coloring and binder may have a weight in a range from about 183.2 to about 224.0 grams/square meter (about 5.34 to about 6.60



ounces per square yard ). In a preferred embodiment of the swab the swab material may have a weight of about 203.6 grams/square meter (about six ounces per square yard).

[00048] As shown in Figures 9d-e, the swab 90 may be formed from two separate pieces which are then attached together on or adjacent to up to three sides by methods such as sewing, melting, fabric welding, or gluing. Alternatively as shown in Figures 9a-c the swab may begin as a single piece which is folded and then attached together on or adjacent to two sides using the same techniques. In both situations a pocket-like swab 90 is formed with one open side which allows entrance of the tool's head 60.

[00049] Referring to Figure 9a-f, the swab 90 has an interior pocket shape defined by the attached edges of the pad and folded common edge in a one-piece pad design. Preferably the interior shape is substantially similar to the shape of the head 60 of the tool. The swab 90 also includes an outer shape which preferably is the same as the interior pocket shape, but may actually be any other desired shape. The interior pocket shape matches the shape defined by both portions of the head 60 which allows the swab 90 to held in place by the head 60 after simple insertion of the head 60 into the swab 90. The swab 90 is secured in this position by movement of the portions 62 and 64 of the head into a Use position. The preferred shape of the head 60 and interior pocket shape is a trapezoidal shape with the two non-parallel sides bowed outwardly.

[00050] Chart 1 below in association with Figures 9a-e shows the preferred exterior dimensions of swabs 90 formed from either one piece of two pieces.

CHART 1

Reference	Dimension (centimeters) $\pm$ 0.01	Dimension (inches) $\pm$ 0.01
A	9.68	3.81
B	14.30	5.63
C	7.14	2.81
D	6.30	2.48
E	5.82	2.29

F	9.85	3.88
G	10.74	4.23
H	1.24	0.49
I	6.68	2.63
J	9.85	3.88
K	10.74	4.23
L	4.11	1.62
M	5.00	1.97
N	0.89	0.35
O	6.73	2.65
P	7.57	2.98
Q	5.87	2.31
R	0.89	0.35

[00051] Chart 2 below in association with Figure 9f shows the preferred interior dimensions of swabs 90 formed from either one piece or two pieces.

CHART 2

Reference	Reference length (centimeters) $\pm .250$	Reference length (inches) $\pm .250$	Width X at Reference length (centimeters) $\pm .250$	Width X at Reference length (inches) $\pm .250$
A	0	0	4.117	1.621
B	0.635	.250	4.978	1.960
C	1.270	.500	5.702	2.245
D	1.905	.750	6.309	2.484
E	2.540	1.000	6.812	2.682
F	3.175	1.250	7.214	2.840
G	3.810	1.500	7.526	2.963
H	4.445	1.750	7.750	3.051

I	5.080	2.000	7.887	3.105
J	5.715	2.250	7.943	3.127
K	6.350	2.500	7.917	3.117

**[00052]** In a preferred embodiment of the swab, the thickness of a single wall of the swab 90 may be about 3.2 millimeters (about 1/8 inch). The tensile strength at about ten percent elongation of a single wall of the swab 90 in a first direction (shown as  $\alpha$  in figure 9a) may be in the range of about 6.9 to about 19.4 Newtons/centimeter (about 3.9 to about 11.0 pounds/inch). In a second direction, transverse to the first direction, the tensile strength of a single wall of the swab at about ten percent elongation may be in the range of about 0.70 to about 4.1 Newtons/centimeter (about 0.4 to about 2.3 pounds/inch).

**[00053]** Prior to or after the formation and machining of the swab 90, additives are introduced to the swab fabric. These additives may include, binders, surfactants, dyes, scent compounds, disinfectants, and/or detergents. The additive combined may have a weight of about 48.35 to about 53.44 grams/sq. meter (about 1.425 to about 1.575 ounces per square yard). Binders which may be used alone or in combination are Polyvinyl Acetate and Polyvinyl Alcohol. The binder may be applied initially on both sides of the cotton/Rayon swab. Additional binder may be added as the remaining additives are applied to the swab. In a preferred embodiment the detergent used is an anionic detergent based on sodium salt of dodecyl benzene sulfonic acid. A preferred detergent is manufactured by Eastern Color & Chemical Co. and has the title #S-175 Anionic Detergent. The surfactant being used may be one or more of the following: alpha olefin sulfonate, ammonium laureth sulfate, sodium lauryl sulfate; triethanolamine lauryl sulfate.

**[00054]** The swab is easily flushable in part due to its size. However, the swab, in a preferred embodiment, is not of the type which is ripped or torn when removed from the tool head. In fact, the swab is of a sufficient strength, in the preferred embodiment, to resist tearing along the swab seams, since the swab is maintained on the tool head during operation, in the tool Use or operating position under spring tension. The swab is initially inserted onto the tool head. The tool handle section and head portions are then moved to the Use position by the user, such that the portions of the head are spring biased apart. The separation of the tool head portions caused

by the spring and cam causes the swab to be placed in tension. If the swab were substantially of paper or other thin materials, it would not resist the tension applied by the tool head, particularly once it was immersed in water and used for toilet scrubbing. Additionally the swab components are preferably biodegradable.

**[00055]** Referring to Figures 6 and 7, a caddy 80 may be used to support the tool 20 when a swab is not attached. The caddy 80 may include an indentation 82 similarly shaped to the head 60 of the tool 20 and an indentation 84 shaped like a portion of the middle section 40. Into these indentations 82 and 84 fits the head 60 and middle section 40 of the tool 20 and the tool 20 is held in place. The caddy 80 may also include an additional cavity 86 for placing a replacement swab 90 to assist in “hands-off” application of the swab 90 to the tool 20. Additionally, swabs may be sold positioned within the cavity 86 when sold with the caddy 80. The head 60 of the tool 20 may be inserted into the swab 90, which is supported by the caddy 80 as shown in Figure 7, without the user having to touch the swab 90 with his hand. The caddy 80 may be made of any material, but preferably is a polymer such as polycarbonate, cyclac or ABS and is formed by molding. The caddy 80 may also include a drip tray 88 below the indentation where the tool 20 is held. Figure 10a and 10b show an alternate embodiment of the caddy 180. Caddy 180 includes a plurality of additional cavities 186 for holding replacement swabs.

**[00056]** Referring to Figure 8, the tool 20 and caddy 80 may be held together in multiple ways for shipping and/or display. In one embodiment, the tool 20 and caddy 80 are attached to a cardboard or plastic piece 100 which facilitates the hanging of the tool and caddy upon a display shelf. Additional packages of swabs may also be purchased in separate containers for use within the tool and/or caddy.

[00057] Figures 11, 12 and 13 show an alternate embodiment of the head 160 and pushrod assembly 150 of the toilet cleaning tool 120. The pushrod assembly 150 includes a linkage system 172 and pusher paddle 174. In a first or loading position shown in Figure 11 the pushrod 156 is fully retracted causing the pusher paddle 174 to be concealed within the head 160 and the portions 162 and 164 of the head 160 to be in a compressed configuration. Figure 12 shows a second partially extended position of the pushrod 156. In this position, the paddle pusher 172 remains concealed within the head 160, however the linkage 172 is rotated such that the portions 162 and 164 of the head 160 are expanded apart. Figure 13 shows a third position of the pushrod assembly 150 wherein the pushrod 156 is fully extended. The paddle pusher 174 is extended outside of the head 160 which would allow the removal of a swab (not shown) from the head 160 of the tool 120. Additionally, the linkage 172 is further rotated allowing the portions 162 and 164 of the head 160 to retract back into a compressed position which allows the swab to easily slide off of the head 160.

[00058] Figures 14 and 15a-c show an alternate embodiment of the toilet cleaning apparatus comprising a tool 220 and swab 290. In this embodiment, the swab 290 is detached from the head 260 of the tool 220 by the opening of two portions 262 and 264 of the head 260. A slide control button 252 is used to extend a control arm 272 which includes an armature 274 at the end of the control arm 272 opposite the handle section 230 of the tool 220. The head 260 includes a hinge 266 at an end opposite the end attached to the middle section 240 of the tool 220. The head 160 may include a plurality of barbs 280 used to hold the swab 190 in place during use.

[00059] The swab 290 may again be formed from a single piece, bound on two sides, or two pieces, bound on three sides. The swab 290 includes perforations which allow two of the bound sides to be separated as the two portions 262 and 264 of the head 260 are fully expanded.

Alternatively, the side may be attached in a manner such as gluing or sewing intermittently to allow for easy separation.

**[00060]** Although the invention has been shown and described with reference to certain preferred and alternate embodiments, the invention is not limited to these specific embodiments. Minor variations and insubstantial differences in the various combinations of materials and methods of application may occur to those of ordinary skill in the art while remaining within the scope of the invention as claimed and equivalents. Use of the term “or” herein is the inclusive, and not the exclusive use.